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1886) from Catalina is probably to be referred here (Brandegge, *Zoe* **1**: 148. 1890).

THELYPTERIS FILIX-MAS (L.) Nieuwl. Am. Mid. Nat. **1**: 226. 1910.

Male fern. Sweet fern.

Polypodium Filix-mas L. *Aspidium Filix-mas* Sw. *Dryopteris Filix-mas* (L.) Schott. *Polystichum Filix-mas* Roth. *Nephrodium Filix-mas* Rich.

Illus.: Eaton, *Ferns* No. Am. pl. 41, 1879. Frye & Jackson, *Am. Fern Jour.* **4**, pl. 9, pl. 11, f. 3 & 4. 1914. Britton & Brown, *Illus. Flora*, **1**, fig. 45. 1913.

Among rocks in Holcomb Valley! in San Bernardino Mts. Only a single collection is known from Southern California, that was made by Parish Brothers in August, 1882, at 8000 ft. alt. (Parish, *Fern Bull.* **12**: 10. 1904 and Maxon, *Am. Fern Jour.* **11**: 4. 1921). No doubt through a slip of the pen, Maxon accredited this fern to Snow Canyon instead of Holcomb Valley (*Am. Fern Jour.* **11**: 107. 1921).

(To be continued)

Ferns as House Plants.¹

R. C. BENEDICT.

Ferns! What does the word bring to mind? To me it recalls the outdoors; woodland, streamside, mountain slopes. Ferns suggest tropical forests and jungles; or, to let the thought run back in time, ferns call up vistas of ancient vegetation when no flowering plants existed. Then ferns were the predominant plant type, and from the dead ferns and similar plants of that period, by some extraordinary reduction process, we have coal.

¹Reprinted also as a Leaflet of the Brooklyn Botanic Garden. The plants illustrated were grown at the Brooklyn Botanic Garden, and the photographs for the illustrations were made by Louis F. Buhle, Garden photographer.

But ferns are not merely denizens of the wild, remote and untamable. They are a common sight along city streets, in store windows. Retail florists' shops show dozens of plants. Commercial growers throughout the country raise literally millions of fern plants every year, and these find their way eventually into hundreds of thousands of homes. What characteristics have ferns that make them the most successful of all house plants?

If you will let your thought seek for a moment the distinguishing feature of ferns, you will realize that their individuality is expressed almost entirely in their leaves. The word "fern-like" presents a picture of a feathered leaf, with serried leaflets along two sides of a median stalk. Such a leaf may be long and narrow, or short and broad; the division may be reduplicated several times, but always the feathered cutting suggests a fern. As a matter of fact, ferns offer also leaves of all imaginable shapes, simple and undivided, hairlike or broad, mosslike or leathery, clinging, et al.

Ferns as house plants offer, then, leaves in infinite variety of shapes, of types of division, of shades of green. Some are even variegated with white, red, and other colors. Thoreau's characterization, "Nature made ferns for pure leaves," cannot be too often quoted. To it may be added the fact that although Nature made ferns millions of years ago, she has never since surpassed the beauty of the fern leaf type in the leaves of later manufacture. Secondly, a good house fern is continuously beautiful throughout the year. It does not depend for its attractiveness upon the occasional production of transitory flowers. Such a fern plant will last longer, even in the unfavorable conditions of a dwelling house, than practically any kind of flowering plant.

CARE OF FERNS IN THE HOME

Success with plants in the home—ferns or any other

plants—is really a matter of human nature. Do you admire and appreciate the beauty of a living plant? Besides a simple esthetic appreciation, do you realize that a plant is a living, growing being—an eating, breathing, drinking, feeling organism, which thrives or pines according to its environment and the care it receives? Can you take enough interest in a plant pet to study and understand its few and simple needs, and systematically to supply these—a daily drink of water, good light, pure air, cleaning, and an occasional new supply of soil food and root space?

With many people, particularly in cities, a plant is mainly a means of temporary decoration, to be used like a picture or hanging, according to the needs of the room. They would like to have it remain beautiful indefinitely, but—"I don't know what is the matter. I can't seem to make plants grow." Under the frequently unsatisfactory conditions of city homes no one can make plants grow successfully. With poor light, gas fumes, and overheated rooms, it should be thoroughly understood that plants are to be considered merely as temporary decorations, like flowers, but lasting weeks or months where flowers last days. If the place to be decorated happens to be a well lighted window, and the plant receives a daily drink, it may surprise its hosts by refusing to die even months after its arrival, but it will probably wear out its welcome in its cumulative decrepitude.

In the country and in smaller cities especially, there are those who like to try to *grow* plants in their homes just as others keep birds, dogs, cats, or other animal pets. Their idea is not so much that here is a dark corner in which a plant would look well, or here is a dining table (in the middle of a dark room) which needs a plant centerpiece. Some people like plants. They enjoy trying to keep them growing successfully from one year to

the next. With that point of view, the arrangement of the room becomes secondary to the interests of the plants. These are given the best window in the house, without intervening curtains. Their care is as much a matter of the daily routine house work as the preparing of meals, etc.

As a matter of fact, both viewpoints may be justifiable. House plants are beautiful as part of the scheme of home adornment, even though they require replacement at rather frequent intervals. They are also interesting as living things, to be cared for and studied.

The essential principles of house plant care have already been indicated above. Applied to ferns, and reduced to definite rules, they may be stated as follows:

1. Water regularly, a little every day. Do not let the plant become dried out. A parched fern looks gray and dull, and droops. Do not keep the soil so wet that it is muddy. When a fern has "wet feet" continually, its leaves turn yellow.

2. Keep the temperature moderate, not over seventy, nor under fifty, unless the plant is semi-hardy, as will be described below. Ventilate the room if gas is used, but do not stand the fern in strong drafts.

3. Clean the leaves if they become dusty or buggy. The leaves are best washed when the air is such that they will dry off quickly, though not in hot summer sun.

4. Give the plant the best lighted window in the house, a sunny window except perhaps in the hottest summer days. The florist often grows his ferns in full sunlight the year around, but he keeps the air moist, a condition not possible in houses. Do not rotate the plant with the idea of making it develop symmetrically. All the new leaves will be under-developed, and only those toward the light will benefit by the light at any one time. You have never seen leaves growing naturally facing away from the light.

5. If all the preceding requirements have been met, the fern should increase gradually in size until it becomes rootbound. Repotting is best done in May or June, and if the plant can then be plunged into the soil, pot and all, in a shady corner of the yard, the summer out-of-doors will be reinvigorating, and the new growth strong. During the year, fertilizer may be given in the form of weak sodium nitrate solution, Clay's fertilizer, or any leaf food.

The first three rules are concerned merely with maintaining the fern in the condition received as long as possible. The last two rules have to do with the quality of the new growth. With the conditions of the florist's greenhouse as ideal, the aim should be to make the home environment approximate as nearly as possible the ideal. The resulting plant will be a compound of three factors, the individuality of the plant itself, the environment supplied, and the personality of the owner of the plant.

THE BEST KINDS OF HOUSE FERNS.

Since the question of house plants is of particular interest to the home maker, I asked the arbiter of a home in which I am acquainted just what she wanted to know about ferns as house plants. "How they look and how they last," was the answer which really epitomizes the whole problem of selecting house plants in general. What ferns look best, are most decorative? Which kinds last, remain decorative for the longest time?

The matter of looks is largely one of personal taste. Different people fancy different types. Among the forms illustrated and described a wide variety exists. Some are smooth, some ruffled; some are dark green and glossy; others paler with dull surface. Some may grow to a height of two to four feet or more; others never become more than a foot tall. Some are divided in typical

feathery fern fashion; others are tasselled, forked, or otherwise subdivided. One not uncommon in florist's establishments, though not shown here, has simple sword-shaped leaves (bird's-nest fern). All are attractive in appearance.

One further point as to culture may be made. The florist divides cultivated plants in general into four classes according to their temperature requirements, viz.; "hardy," "semi-hardy," "greenhouse," and "stove," the latter requiring the highest temperature. The ferns suitable as house plants all belong in the second or third class.

Ferns classified as semi-hardy come originally from warm temperate regions, where they were accustomed to rather cold winters. For this reason they do best when allowed to rest most of the winter, and they are well suited to be kept in rooms which are kept fairly cool, with the windows opened perhaps at night as in sleeping rooms, provided the temperature does not go below freezing too long. Some of them do well in an outdoor garden from Philadelphia southward.

The other class, the so-called "greenhouse" ferns, hails from subtropical climates, like southern Florida. At home their growth slackens during winter but does not entirely stop, and they cannot stand temperatures below forty. Even below fifty is undesirable.

In general, the semi-hardy kinds make tougher, better lasting leaves, which stand up even under neglect for a long time. The subtropical varieties form fuller, more compact plants, and continually replace older leaves with new fresh ones if growth conditions are sufficiently good.

The semi-hardy varieties illustrated in this paper are all included in three genera, *Dryopteris*, *Polystichum*, and *Cyrtomium*. Among the subtropical forms, ten genera are represented. The names used are based on the

recently adopted standardized list of cultivated plant names which has been adopted as official by the various florists' associations and other organizations. At present, the trade nomenclature of common cultivated plants is in a sad state of confusion, but the newly determined list is a long step toward uniformity, though it will take considerable time before the information is assimilated throughout the body of commercial florists at large.

Semi-hardy varieties

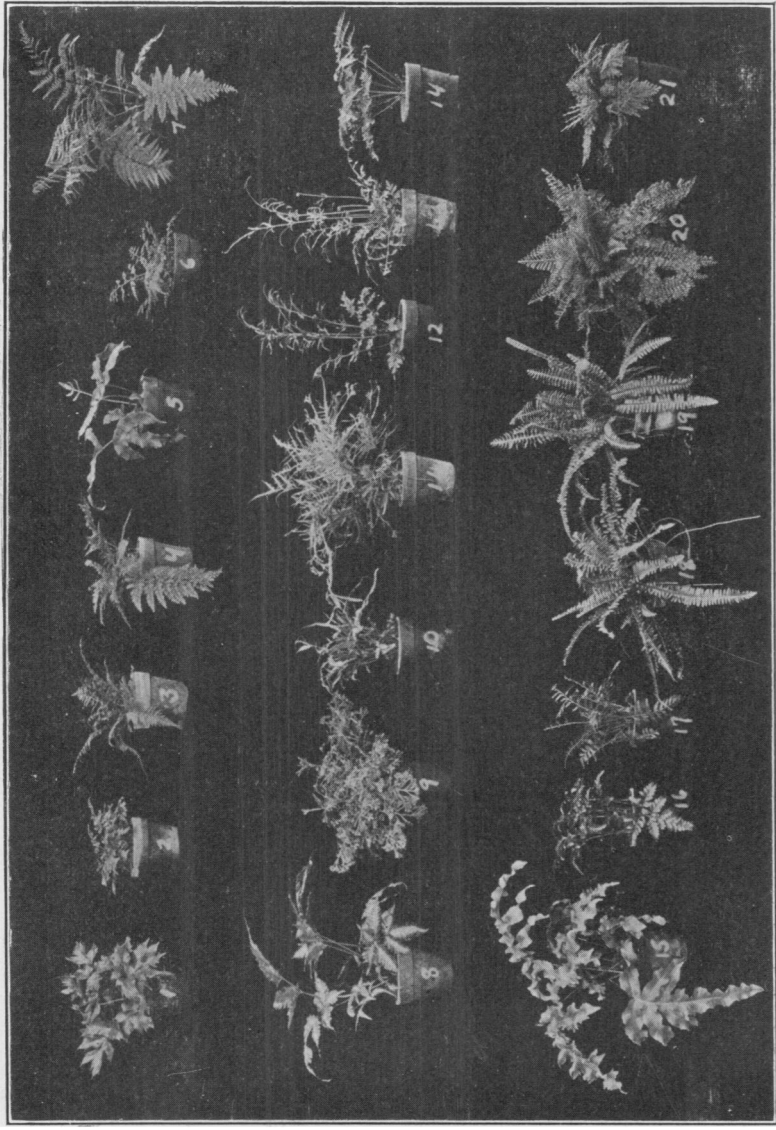
Cyrtomium falcatum (Plate 5, figure 1). Holly fern.

The variety illustrated is var. *Rochfordianum compactum*, introduced by Dreer, a dwarf sport of the Rochford variety brought out in England. Another variety, *Mayi*, has forked and crested leaf tips and pinnae. Any of these holly fern varieties are excellent for the house; lasting, as well as beautiful. The leaves grow in a circle from a scaly crown, after the fashion of our wild Christmas fern, but the pinnae of the holly fern are much broader, and in the *Rochfordianum*, beautifully ruffled and lobed, dark glossy green, one to two feet long. Native in Pacific Islands and Asia.

Polystichum adiantiforme (*P. coriaceum*, a better known name). (Plate 5, figure 2.) Leather fern.

Another excellent house fern, to which the illustration does less than justice. It is tall-growing, with a creeping, scaly stem; the leaves, which may reach two to three feet in height, are triangular, three- to four-pinnate, and extremely tough and lasting. It has been planted in Florida to some extent for use in the cut-leaf trade. Native in South Africa.

Polystichum tsus-simense (*P. "tensemense"* as sometimes corrupted in the florist's trade). (Plate 5, figure 3.) Tsusima holly fern.



TWENTY-ONE HOUSE FERNS SHOWN IN SMALL PLANTS

A small fern, twelve to fifteen inches high, forming compact clumps of several tufted crowns of leaves. The leaves are rather dark green, dull, twice pinnate, erect. With *Cyrtomium*, it is one of the commonest ferns grown as "table" ferns, for filling baskets and fern dishes. Native in the Japanese islands.

Dryopteris viridescens (Plate 5, figure 4). Glossy wood fern.

Offering perhaps the most beautiful leaves of the entire list. The leaves develop in a circle, are three-pinnate, one to two feet long, pale green at first, with spinulose segments. It is of the type of our wild *D. intermedia*, though well distinguished. Native in China.

Dryopteris Sieboldii (Plate 5, figure 5). Siebold's wood fern.

An odd triangular-leaved fern, with a few large broad pinnae. In the fertile leaves the pinnae are contracted. The leaves spread horizontally, and are about a foot long at most; dull, pale green. Native in China and Japan.

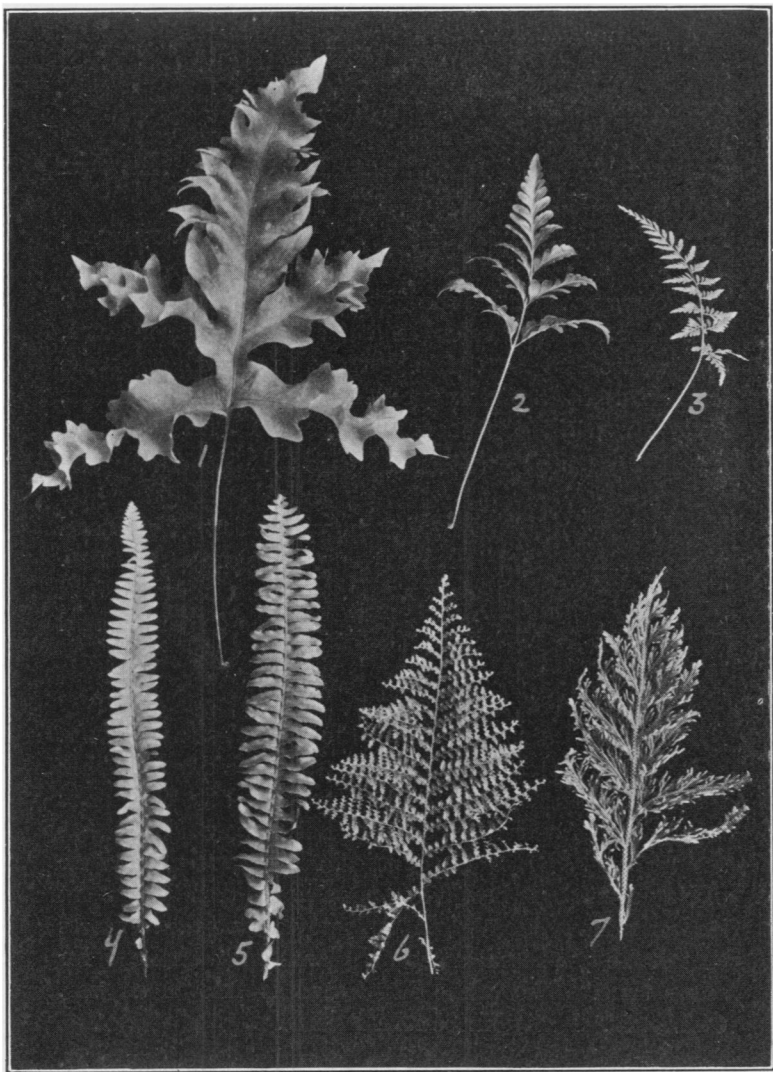
Subtropical varieties

Adiantum cuneatum (Plate 7, figure 7). Delta maidenhair.

Probably more people have heard of maidenhair ferns than of any other single kind. Our common wild species is only one of over a hundred species, nearly all of which are tropical. Of all the species, *A. cuneatum*, in some of its varieties, is best adapted to house conditions; but its leaves have such a thin, delicate texture that success cannot be promised, although plants may be kept for some time. The plant illustrated is known as var. *California*. Native in South America.

Davallia solida (Plate 5, figure 16 and plate 6, figure 2). Glossy davallia.

Davallia is best known for two other Japanese species formerly sold commonly as "fern balls," i.e., bundles



1. BEAR'S-FOOT POLYPODY. 2. SHINING DAVALLIA. 3. EARED SPEENWORT.
4. MILLS' BOSTON FERN. 5. TUBER FERN. 6. VERONA
FERN. 7. EMMEL SELAGINELLA.

of rhizomes in a resting condition, made up with moss and starting into growth with watering. The species illustrated has a harder glossier leaf, triangular, tri-pinnate, about a foot long at most, from a creeping rootstock, and makes a very attractive little plant. Native in Polynesia and Australia.

Asplenium auritum (Plate 5, figure 17 and plate 6, figure 3). Spleenwort.

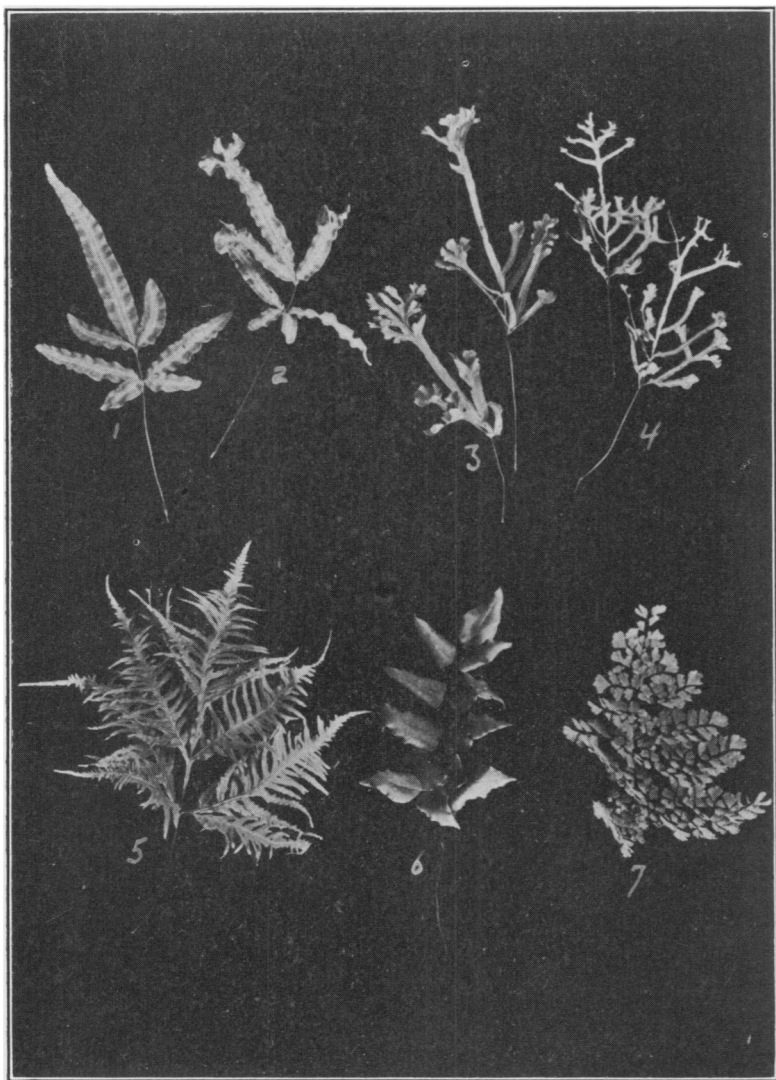
A little, bipinnate species, with slender divisions, the leaves growing about a foot at most. Not a recognized house fern, but included here to illustrate the genus. A more common, cultivated asplenium, the bird's-nest fern, *A. nidus*, was not available in small size. Native in American tropics.

Nephrolepis cordifolia (Plate 5, figure 19 and plate 6, figure 5). Tuber fern.

A good house fern, though not so well known as the following. The leaves are narrow, usually with blunt pinnae, dull, pale green, erect and spreading. One form has scaly tubers of the size of walnuts. The leaves are particularly resistant to drying, retaining their form under conditions which would cause many fern leaves to wilt and die. Native in tropics.

Nephrolepis exaltata. Sword fern.

No description of house ferns would be complete without the inclusion of varieties of the sword fern or rather, its variety, *bostoniensis*, deservedly the most widely grown of all cultivated ferns. Although not as hardy as the holly fern and others of that type, the stronger Boston fern varieties do well under house culture, and may be continued year after year with proper care. With one hundred named forms to choose from, the present article shows only two of distinct type. Native in tropics generally.



1. RIBBON BRAKE. 2. ALEXANDRA BRAKE. 3. WILSON'S BRAKE. 4. MAY'S
BRAKE. 5. RIVERTON BRAKE. 6. GREEN CLIFF BRAKE.
7. DELTA MAIDENHAIR.

“Mills’ Boston” (Plate 5, figure 18 and plate 6, figure 4).

A new, compact, once pinnate variety, less than one-third the size of the Boston fern itself, but adapted in its size to smaller space, and particularly good because of its tough, lasting leaves.

Verona fern. (Plate 5, figure 20 and plate 6, figure 6.).

A three-pinnate variety of Boston fern, probably the best of the lace type for house conditions, and commonly offered in the trade.

Onychium japonicum (Plate 5, figure 6). Carrot fern.
Japanese claw fern.

The carrot fern is a delicately pretty little species, sometimes sold as a table fern, but unsuited to ordinary house conditions. It would succeed better in a Wardian case or under a large bell jar. The leaves are slender, three-pinnate, with narrow segments, suggesting somewhat a carrot leaf. Native in Japan, China, Java, etc.

Pellaea viridis (*Pteris adiantoides* of trade.) (Plate 7, figure 6). Green cliff-brake.

Tall-growing, one to two feet, two- to three-pinnate, with dark brown, wiry, stalks and midribs, and dark dull green, ovate, segments. A commonly sold table fern which will grow in the house with reasonably good care. Native in South Africa.

Pityrogramma Martensii (Plate 5, figure 7). Gold fern.

The particular gold fern which was available for illustration is very sensitive and not suitable for house use, but there are two or three hardier species which may be counted possible house plants. They are:—*P. triangularis*, California gold fern; *P. sulphurea*, Jamaica gold fern; and *P. tartarea*, silver fern. They are easily distinguishable by the covering of yellow or whitish powder on the underside of the leaves.

Polypodium aureum (Plate 5, figure 15 and plate 6, figure 1). Bear's-foot fern. Golden polypody.

This tropical American species, occurring in Florida, is not well known as a house plant, but will succeed none the less with ordinarily good care. The ruffled variety illustrated, var. *Mandianum*, Manda's polypody, is most attractive. Under greenhouse conditions, the leaves will reach a length of six feet, arising separately from the creeping, scaly rootstock; but in the house, it will not grow so tall. Native in American tropics.

Pteris cretica (Plate 5, figure 10). Cretan brake.

After the Boston fern varieties, the next most common house fern types are found in the genus *Pteris*, and *P. cretica* offers the most varieties. They will generally grow well under the conditions proper for the Boston fern, but require more top light to make well shaped plants. Native in Europe and Asia; and in Florida. The following varieties are among the best.

albolineata (Plate 7, figure 1). Ribbon brake.

Like the wild form, except that through each leaf division there runs a distinct white line of variegation.

Alexandrae (Plate 7, figure 2). Alexandra's brake.

A crested form of the preceding, with tasselled tips.

major (Plate 5, figure 10). Plain green, about like the species.

Mayi (Plate 7, figure 4). May's brake.

A crested, variegated form, with the leaf divisions forking lower than in *Alexandrae*.

Rivertoniana (Plate 7, figure 5). Riverton brake.

Has broad, full pinnae, irregularly lobed and ruffled.

Wilsoni (Plate 7, figure 3). Wilson brake.

One of the most commonly grown varieties, clear green with tasselled tips, forming a compact plant.

Wimsetti multiceps (Plate 5, figure 11). Wimsett brake.

Somewhat like *Rivertoniana* but with tasselled tips, and narrower pinnae.

Pteris ensiformis (Plate 5, figure 12). Sword brake.

Grown mainly in the variety *variegata* or *Victoriae*, Victoria brake or "Queen fern" (Plate 5, figure 13), but also in a ruffled variety, *Sieboldi*, Siebold's brake (Plate 5, figure 2). It is an interesting little species, with dimorphic leaves, the fertile always much taller, and erect. Used by florists to give variety in height in baskets and fern dishes. Native in Asia.

Pteris quadriaurita argyraea (Known in trade as *P. argyraea*). (Plate 5, figure 8.) Silver brake. Striped brake.

A very attractively variegated variety which will reach three feet or more under greenhouse conditions. Not easy for house culture. It is used by florists in small sized plants for its color effect in connection with plain green ferns. Native in eastern Asia.

Pteris multifida (*P. serrulata*, the best known name) (Plate 5, figure 9). Spider brake.

Similar to *P. cretica*, but with much narrower divisions of the leaf. The variety illustrated, *cristata*, crested spider brake, is beautifully tasselled. There are numerous forms, some variegated. Native in Eastern Asia.

Pteris tremula (Plate 5, figure 14). Australian brake.

A large species when full-grown, but mainly in small sizes. It is easier to grow than *P. quadriaurita argyraea*. The leaves are clear green, divided somewhat after the fashion of our wild brake, *P. aquilina*. Native in Australia.

Selaginella Emmeliana (Plate 5, figure 21). *Emmel selaginella*.

The selaginellas are not ferns in a true sense, although they are often grouped with ferns, both horticulturally and botanically. The genus includes some of the most beautifully colored of all vegetative plant growths, some showing various colors with an iridescent sheen. *S. Emmeliana*, and its yellow form, *aurea*, are rather common with florists, and will stand house culture if the water supply is never neglected. Parched for a day, however, they wither and lose their beauty, although they will make a good new growth after some time. In the illustration (Plate 6, figure 7) what appears to be a leaf is really a "frond" in the original meaning of that term, that is, a leaf-like structure, made up of a branching stem with numerous small leaves.

The twenty-eight varieties just described do not by any means exhaust the different kinds grown in this country by florists, and useful as house plants, but they will serve to give a general idea of what is available. Eighteen of the twenty-eight were obtained from one grower who specializes in ferns (Dreer of Philadelphia) as representing his stock. The others were added from the Brooklyn Botanic Garden collection to give a greater variety. The pictures show plants practically all in uniform sized pots, and are intended to afford a comparison of the various kinds at about the same stage of growth. In some cases the small plants give a very inadequate representation of the character of the forms concerned. However, with pictures and description combined, readers should be able to make a preliminary determination of their preferences. Since the plants are generally offered by retail florists in even smaller sizes, the illustrations should better serve the purpose of identification than would pictures of fully developed plants.

BROOKLYN BOTANIC GARDEN